

PORTSMOUTH CIVIC CENTER



Final Submittal

Prepared by:

PACE Collaborative, P.C.

**Mechanical-Electrical Engineers
1277 Perimeter Parkway
Virginia Beach, VA 23454
(757) 499-7223**

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CONDITION ASSESSMENT

TABLE OF CONTENTS

I.	Executive Summary	1
II	General Information.....	3
III.	Basement and Mechanical / Electrical Room	4
IV.	Police Division.....	18
V.	Judicial Building “B”	24
VI.	Jail	27

Most of the lighting has been upgraded to fluorescent fixtures with T8 lamps and electronic ballasts. These fixtures are aged and should be upgraded to LED to meet current energy use standards.

Immediate Repair Needs:

The current use of the buildings requires the following immediate repairs to ensure proper conditions and safety are provided for occupants:

- Sprinkler system replacement - \$575,000
- Central cooling plant repair - \$100,000
- Storm water pump discharge repair - \$10,000
- Domestic water booster system replacement - \$80,000

Total Immediate Repair and Construction Cost - \$770,000

Continued Use of Buildings Repair and Replacement Needs:

Future use of the buildings will require replacement and upgrade to all HVAC, plumbing and electrical systems of the buildings. The following budget is an approximation based on square footage costs and includes design fees associated with the replacement of the systems.

- Estimated Construction Cost - \$14,580,000
- 15% Contingency budget - \$2,188,000
- Design Fees - \$1,400,000

Total MEP Construction and Design Cost - \$18,168,000

III. Basement and Mechanical/Electrical Room

A. Fire Protection

The basement and mechanical room is protected by a dry pipe sprinkler system, the jail is provided with a Class I automatic wet standpipe system in the stairwells. All piping serving these systems is steel and is contemporary with the construction of the building.

The main 8" fire service enters at the basement level, supplying water to a diesel fire pump. The diesel fire pump is original to the building, supplying 1,000 gpm at a 100 psi boost. A single wall diesel storage tank sits adjacent to the fire pump, and is replenished by the central diesel distribution system. Sprinkler mains distribute overhead to the sprinkler systems and standpipe systems.

Observations:

At the time of the visit, the diesel fire pump was not in functional condition, and the dry pipe sprinkler system was in very poor condition. Since the operation of the fire pump is critical to the use of the standpipe systems and the sprinkler system, all systems are currently impaired and require intervention by the responding fire brigade. This results in a delayed response to a fire event and possible loss of life/property.

Recommendations:

Due to the age and condition of the existing systems, it is recommended that all sprinkler pumps, service, piping, standpipes, and sprinkler systems be replaced in their entirety. A life safety code analysis should be performed for each building to determine if sprinkler systems should be extended to areas currently not protected.

B. Plumbing

The main domestic water service, pressure booster pumps, and water heaters are housed in the basement level mechanical room. The existing water service enters from the municipal main individually supplying (3) domestic water booster pumps via 4" double check backflow preventers. The (3) domestic water booster pumps are vertical turbine constant speed pumps, each rated for 275 gpm at 80 psi, manufactured by Syncroflow. Domestic hot water is generated by (2) Precision Inc. 150 gallon tanks heated by central heating water. An existing RECO Industries Gas fired water heater is abandoned in place. Domestic hot and cold water is distributed to the building generally in stacks, with hot water circulated back to the water heaters. Sanitary piping is general cast iron throughout the facility. Storm drainage in the basement parking area is ejected by a duplex ejector pump, sanitary drainage from the basement level is ejected by a duplex ejector pump.

Observations:

Water distribution piping is general in poor condition with the exception of a new main run from the exterior of the building to the backflow preventers. This new main run was recently installed using National Pipe and Plastics Dura-Blue PVC water transmission pipe. While this pipe may be suitable for installation exterior to the building (water service pipe), the

Observations:

At the time of the visit the chiller was not operational. Oil pressure alarm was on the chiller control screen. The chiller has reached its expected service life of 25 years.



Chiller appears to be in poor condition.

Recommendations:

Have the chiller serviced and repaired. Plans should be made to replace the chiller in the near future.

Boilers (B-1 and B-2), are Crown Boiler Co. model VH 19, installed in 1996, with 4,240 mbh capacity each.

Observations:

Boilers appear to be in reasonable condition, considering their age. Both are operational. One boiler is needed to run throughout the summer to provide domestic hot water to the buildings. It appears that original "summer" boiler (that provided domestic water) has been disconnected (piping wise), but the power is still connected. Boilers have reached their expected service life of 22 years (they are approximately 23 years old).

Recommendations:

Have the boilers serviced annually. Plans should be made to replace the boilers in the near future. Recommend utilizing new high efficiency boilers for replacement in order to maximize energy usage savings.

Condenser water pump P-4 and secondary chilled water pump P-3 appear to be in poor condition, although still in operation and without visible leaks, considering they are approximately 25 years old. Expected service life for this type of equipment is approximately 20 years old. Plans should be made to replace the pumps in the near future.

Primary chilled water pump above C-2 appears to be in poor shape. Visible leaks, uninsulated and corroded.



Chiller 2 circulating pumps (located directly above the chiller)

Dual Temperature pump serving the jail motor has bad bearings (very noisy operation), is very badly corroded and has visible leaks.



Pump serving the Jail building

Hot water pumps, both show signs of leaks and corrosion. Exact age is not known but they appear to be over 20 years old. Expected service life for this type of equipment is 20 years. One of the pumps (P-1) was disassembled during the site visit. Both pumps are in poor condition and should be replaced.



Disassembled Pump P-1

Domestic hot water heat exchanger is covered with plastic to protect it from water leaks through building expansion joints. It appears to be operational but not in a good condition. Recommend eliminating it once it fails, and installing a new domestic hot water heating system, which would also eliminate the need to run a very large heating hot boiler in the summer to provide domestic hot water.



Domestic hot water heat exchanger

Dual temperature switch over valves do not function and the switch over from heating to cooling needs to be done manually. The valve non-functioning pneumatic actuator is being held together by a strap. When the system is switched over, according to maintenance personnel, it causes relief valves to open due to differential in two system pressures.



Expansion tanks are water logged and no longer functioning. Replacement is made difficult by the lack of isolation valves, therefore requiring the drain down of majority of the system.

Controls system is a mixture of pneumatic and direct digital controls. Majority of the actuators are pneumatic. They are obsolete and repair kits are no longer made for them. They leak air and most are non-functioning. The pneumatic side of the controls system has air leakage in all of the buildings, and causes the air compressor powering the system along with the air dryer to cycle more often than it should. Recommend replacing the pneumatic system with direct digital controls.

Original isolation valves that are still in place are badly rusted and the handles tend to break off when operation is attempted.

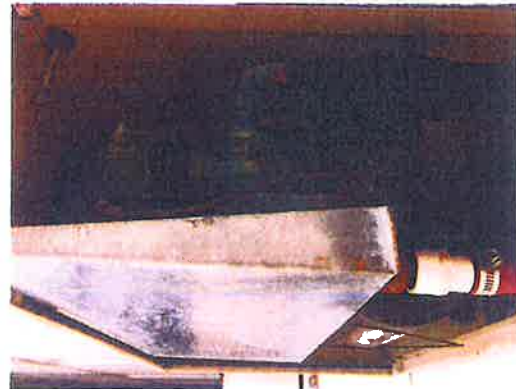
Other piping accessories that have not been recently replaced are severely corroded, indicating elevated moisture, and humidity levels in the mechanical room.



Overall the central heating and cooling plant is in bad shape, some components have been replaced but majority appear to be past their expected service life. There are a lot of leaks in the system as evident by water spots on the mechanical room floor, damaged and missing insulation. Future use of this plant will require major equipment replacement and redesign to accommodate new use and current energy standards.

There are two 10 ton split systems in the basement, with condensers located in the garage area. Systems are Trane BTA120D. Appear to have been installed in 1988, making the units approximately 31 years old. Typical service life for DX equipment is approximately 15 years. Area served by the units appears to have been vacated and currently used for some storage.

Fan coils in the basement appear to be original to building construction and are in bad shape. Most do not function and are in disrepair. Filters are dirty and have not been replaced in some time, control valves are not functioning, and some of the access panels are missing.



Basement Fancoil Units

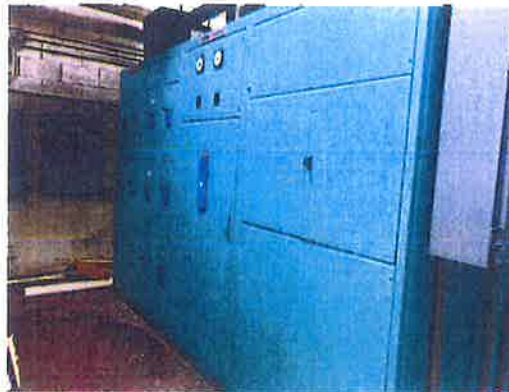
D. Electrical

Electric Service

The electrical service for the Civic Center is provided from a Dominion Energy pad mounted transformer located in the basement. The area is separated from the other parking area by a chain link fence. The primary service enters the space in raceway and is run exposed through the space to the transformer. The doors to the primary section of the transformer are open to allow the primary feeder to enter the transformer. The secondary service from the transformer to the switchboard is run in feeder busway. The busway is run exposed from the transformer to the switchboard.



The electric service to the facility is rated 2500-amps, 480/277 volts, 3-phase, 4-wire. It is delivered via the Dominion Energy pad mounted transformer and busway to the incoming / metering compartment of the main switchboard. The existing switchboard is manufactured by General Electric A/V Line switchboard.



The switchboard includes the following: an incoming section for the busway connection and a utility metering compartment, a main circuit breaker section with an ammeter and volt meter, and two distribution sections with a total of 12 circuit breakers. The main circuit breaker is rated 2500-amps, 3-pole and includes ground fault protection.

There are additional fusible switches tapped off the bus for additional feeders because of obsolete switchboard and no available space for additional breakers.



The electrical service is metered with five utility meters external to the switchboard.



The switchboard feeds all of the electrical distribution for the entire Civic Center.

Observations

The switchboard and busway appear to be original to the building and is approximately 49 years old. The switchboard and busway are obsolete, and replacement parts would be very difficult to obtain. The switchboard is beyond the expected useful life of 30 years according to the "Building Owners and Managers Association" (BOMA).

Recommendations:

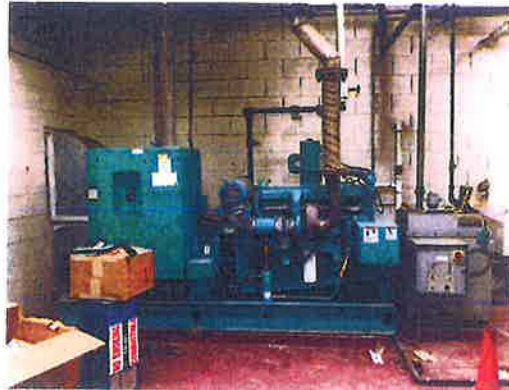
Based on the condition and age of the switchboard, replacement is recommended.

In addition, we recommend that the service and transformer be relocated to a higher elevation to eliminate the potential for flooding.

Emergency Systems

The Portsmouth Civic Center emergency system includes two diesel generators and associated automatic transfer switches. The emergency systems only provide emergency power to life safety and critical loads and does not provide emergency backup for the entire building.

The first generator is a 230 kW at 0.8 power factor, 287.5 kVA, stand-by rated, 480/277 volts, 3-phase, 4-wire, diesel generator and is located in the basement in the mechanical /electrical room. The generator is a Cummins 230DFAB. It is water cooled via city water, which is discharged to a floor drain.



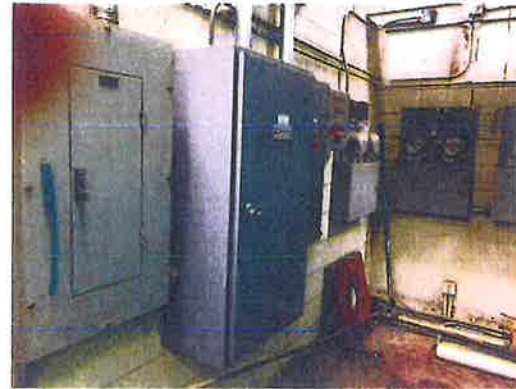
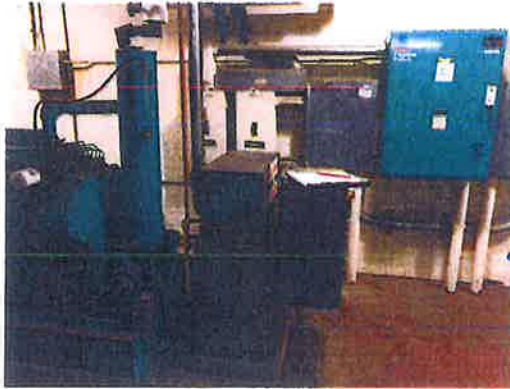
This generator feeds a 600-amps, 3-pole, 4-wire automatic transfer switch (Onan OT 600).



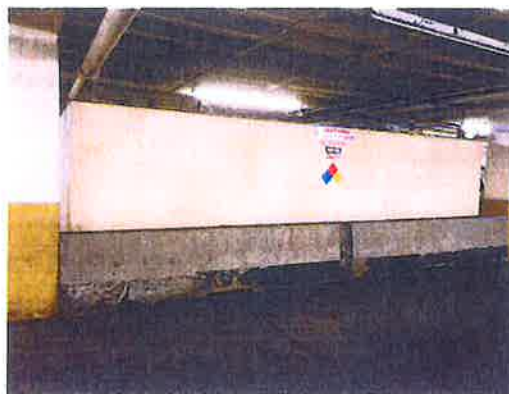
The second generator is a 150 kW at 0.8 power factor, 187.5 kVA, 480/277 volts, 3-phase, 4-wire, stand-by rated, diesel generator and is located in the basement in a separate generator room. The generator is a Cummins 150DGFA. It is water cooled via city water, which is discharged to a floor drain.



This generator feeds two 150-amps, 3-pole, 4-wire, automatic transfer switch. One automatic transfer switch is an Onan OT 150, and the other automatic transfer switch is a Zenith ZTS series.



The diesel fuel is provided from an above ground, fire-rated fuel tank located in the parking garage in the basement.



Each generator has its own day tank with associated simplex fuel supply pump and supply piping. There is no return piping or return pump.



Observations:

Both generators appear to be in good condition and are exercised on a weekly basis. They were installed around 1998 and should be approximately 21 years old. The expected life of the diesel generator is 20 years, and the expected life of the automatic transfer switch is 25 years according to the "Building Owners and Managers Association" (BOMA).

The electrical service has ground fault on the main breaker; however, neither automatic transfer switch has a 4 pole breaker to isolate the neutral from the two separately derived services.

The fuel system to the day tank does not have a return line and return pump to keep the day tank from overflowing in the event that the supply pump did not shut off when called for as recommended by NFPA 31.

Recommendations:

The diesel generators are just beyond their expected life; however, they have been exercised on a weekly basis and appear to be in good condition for their age.

We recommend that the automatic transfer switches be replaced with 4-pole automatic transfer switches, and that the withstand and close on rating be coordinated with the available fault current.

We also recommend that the day tanks be replaced with a duplex pump arrangement so that it has a supply pump and a return pump as required by the NFPA 31.

In addition, we recommend that the generators and automatic transfer switches be relocated to a higher elevation to eliminate the potential for flooding.

Electrical Distribution Equipment

The electrical distribution equipment includes the panelboards, motor control center, and dry type transformers. These items are generally original equipment.



Observations:

The panelboards, motor control center and dry type transformers appear to be original to the building and are approximately 49 years old. The panelboards and motor control center are obsolete, and replacement parts would be very difficult to obtain. These items are beyond the expected useful life of 30 years according to the "Building Owners and Managers Association" (BOMA).

Recommendations:

Based on the condition and age of the panelboards, motor control center and transformers replacement is recommended.

Branch Circuits and Feeders

The branch circuits and feeders in this area of the facility appeared to be copper in metal raceway and are original to the building.

Observations:

Based on the existing drawing and electrical practice at the time of construction, we expect that the branch circuits included multi-circuit homeruns with a common neutral and no branch circuit equipment grounding conductor. With the new electronic ballast for the lighting, no electronic power supplies, third harmonics created on the common neutrals could result in the neutral conductors being overloaded. If equipment grounding conductors are not included in the branch circuits, the loss of grounds could be expected due to the deterioration of the metal raceway in this area of the building.

Recommendations:

Due to the age of the existing conductors, lack of equipment grounding conductors, presence shared neutrals, and the recommended relocation of the main electrical service it is recommended that the existing electrical feeders and branch circuits be replaced as part of building renovations.

Lighting

Lighting in the parking areas and utility rooms consists primarily of industrial fluorescent lights with T-8 fluorescent lamps and electronic ballasts.

Observations:

Existing lighting on both the first and second floors is in fair condition with maintenance required and upgraded controls to satisfy current energy saving standards.

Recommendations:

Due to the type of lighting fixtures and controls, it is recommended that all lighting and controls throughout the facility be replaced. Existing lighting controls and switching arrangements are dated and should be replaced. LED lighting, vacancy, and occupancy sensors are recommended.

IV. Police Division

A. Fire Protection

No fire protection systems exist in the Police Headquarters Facility

B. Plumbing

Domestic hot and cold water is served by the central plant in the basement. Existing fixtures and piping appear contemporary with the original construction of the building, with the exception of the Magistrates Office, which was recently renovated. Sanitary piping was noted to be cast iron where visible. Some fixture groups were removed, with rough-in piping left in place.

Observations:

Fixtures were generally in poor condition, with the exception of the Magistrates office. Where fixture groups were removed, piping was not properly capped.

Recommendations:

Due to the deterioration of fixtures and piping, it is recommended that all plumbing fixtures and piping systems be replaced.

C. Mechanical

Building is served by the central heating/cooling plant in the basement. Chilled water and hot water is distributed through piping in the garage below and routed to a built in place central air handler on the roof mezzanine and a second roof top air handling unit. Original built in place air handling unit serves the 1st floor, the newer roof top air handling unit serves the second floor. Second floor has been abated. First floor is original construction and will require abatement if any modifications are to be made. DDC controls are minimal in the building, most of the functions are still through the pneumatic control system which has multiple leaks.

Unit is utilizing an electrostatic filter system, which does not appear to be functional, has missing filter modules from the rack, loose belts on the fans, debris built up on the coil, control valve does not modulate and leaks, coil is not accessible for proper cleaning or service.



Recommendations

Unit should be replaced with a more traditional and standard air handling unit.

Roof top air handling unit (AHU-2), which was installed in 2008, is a Trane Climate Changer modular unit. Typical service life for this equipment is approximately 15 years.

Observations

Very poor access to filter section. Filters need to be replaced. There is debris within the unit cabinet, fan belt is loose, drain pan is severely rusted, condensate drain line is broken, visible leak in the hot water heating line.



Debris in unit cabinet.



Water leak through a split shut off valve.

Recommendations

Unit should be serviced, cleaned and repaired. With proper maintenance, the unit should have another 5 years of service left.

D. Electrical

Electrical Distribution Equipment

The electrical service for Judicial Building "B" is fed from the main service in the basement.

The electrical distribution equipment includes the panelboards and dry type transformers. Most of these items are generally original equipment.

A portion of the Judicial Building was not accessible, and part of it was recently upgraded, so those areas are not included in this assessment.

Observations:

The panelboards and dry type transformers appear to be original to the building and are approximately 49 years old. The panelboards are obsolete, and replacement parts would be very difficult to obtain. These items are beyond the expected useful life of 30 years according to the "Building Owners and Managers Association" (BOMA).

Recommendations:

Based on the condition and age of the panelboards, motor control center and transformers replacement is recommended.

Branch Circuits and Feeders

The branch circuits and feeders in this area of the facility appeared to be copper in metal raceway and original to the building.

Type "MC" cable appeared to be used for minor circuit revisions in these spaces.



Observations:

Based on the existing drawing and electrical practice at the time of construction, we expect that the branch circuits included multi-circuit homeruns with a common neutral and no branch circuit equipment grounding conductor. With the new electronic ballast for the lighting, third harmonics created on the common neutrals could result in the neutral conductors being overloaded. If equipment grounding conductors are not included in the branch circuits, the loss of grounds could be expected due to the deterioration of the metal raceway in this area of the building.

Recommendations:

Due to the age of the existing conductors, lack of equipment grounding conductors, presence shared neutrals, and the recommended relocation of the main electrical service it is recommended that the existing electrical feeders and branch circuits be replaced as part of building renovations.

Lighting

Lighting in the first floor office and administrative spaces generally consisted of recessed troffers with T-8 fluorescent lamps and electronic ballasts.



The lighting in the second floor and Police Storage areas generally consisted of 2x2, recessed, 3-lamp, parabolic fixtures with three T-8 fluorescent lamps and electronic ballasts suspended with wires.



Observations:

The lighting on the first floor appeared to be in fair condition with some maintenance required and dated lighting controls.

The 2x2 recessed troffer suspended with wire was not properly supported.

Recommendations:

Due to the type of lighting fixtures and controls, it is recommended that all lighting and controls throughout the facility be replaced utilizing LED fixtures. Existing lighting control and switching arrangements are dated and should be removed completely. LED lighting, vacancy, and occupancy sensors are recommended.

V. Judicial Building "B"

A. Fire Protection

No fire protection systems exist in the Police Headquarters Facility

B. Plumbing

Domestic hot and cold water is served by the central plant in the basement. Existing fixtures and piping appear contemporary with the original construction of the building. Sanitary piping was noted to be cast iron where visible. Some fixture groups were removed, with rough-in piping left in place.

Observations:

Fixtures were generally in poor condition. Where fixture groups were removed, piping was not properly capped.

Recommendations:

Due to the deterioration of fixtures and piping, it is recommended that all plumbing fixtures and piping systems be replaced.

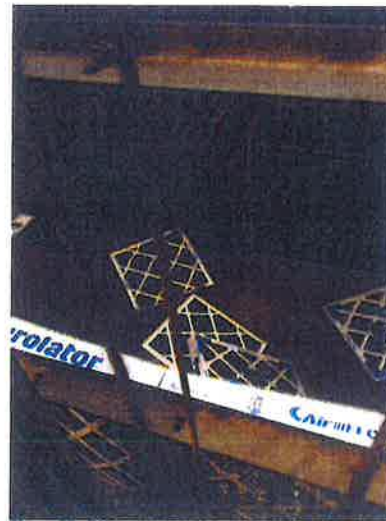
C. Mechanical

Building is served by the central heating/cooling plant in the basement. Chilled water and hot water is distributed through piping in the garage below and routed to a built in place central air handler on the roof mezzanine. 2nd floor has been abated and converted to storage. 1st floor is original construction and will require abatement if any modifications are to be made. DDC controls are minimal in the building, most of the functions are still through the pneumatic control system which has multiple leaks.

Built in place central air handling unit (AHU-1) appears to be original to the building and installed in 1970's. Some components appear to have been replaced over the years but majority of the system appears to be original.

Observations

Unit used to utilize an electrostatic filter system, which has been disconnected and regular pleated filters are being used. Multiple filters are out of the tracks, some have been pulled out of the track by airflow due to debris built up. Unit has loose belts on the fans, debris built up on the coil, control valve does not modulate and leaks, coil is not accessible for proper cleaning or service.



Filters out of track

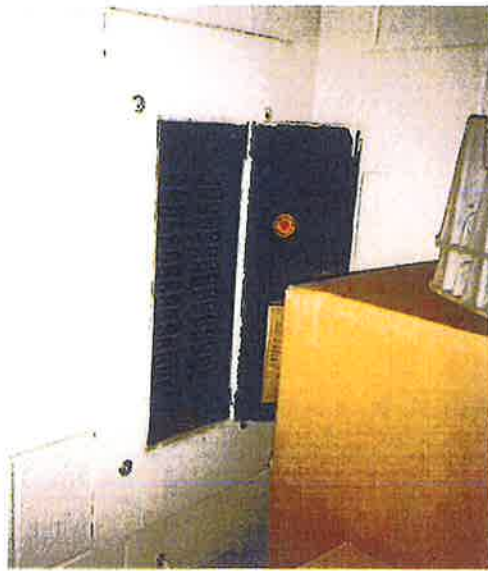
Unit should be replaced with a more traditional and standard air handling unit.

D. Electrical

Electrical Distribution Equipment

The Police Headquarters electrical service is fed from the main service in the basement.

The electrical distribution equipment includes the panelboards and dry type transformers. These items are generally original equipment.



Observations:

The panelboards, and dry type transformers appears to be original to the building and are approximately 49 years old. The panelboards are obsolete and replacement parts would be very difficult to obtain. These items are beyond the expected useful life of 30 years according to the "Building Owners and Managers Association (BOMA).

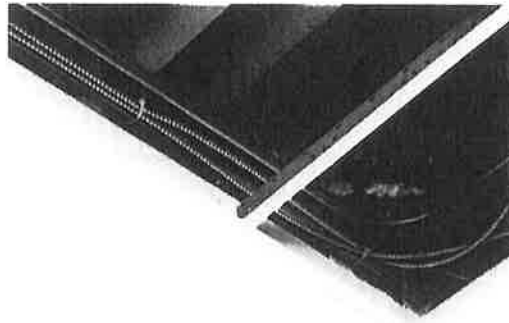
Recommendations:

Based on the condition and age of the panelboards, transformer replacement is recommended.

Branch Circuits and Feeders

The branch circuits and feeders in this area of the facility appeared to be copper in metal raceway and were original.

Type "MC" cable appeared to be used for minor circuit revisions in these spaces.



Observations:

Based on the existing drawing and electrical practice at the time of construction, we expect that the branch circuits included multi-circuit homeruns with a common neutral and no branch circuit equipment grounding conductor. With the new electronic ballast for the lighting and electronic power supply, third harmonics created on the common neutrals could result in the neutral conductors being overloaded. If equipment grounding conductors are not included in the branch circuits the loss of grounds could be expected due to the deterioration of the metal raceway in this area of the building.

Recommendations:

Due to the age of the existing conductors, lack of equipment grounding conductors, presence shared neutrals, and the recommended relocation of the main electrical service it is recommended that the existing electrical feeders and branch circuits be replaced as part of building renovations.

Lighting

Lighting in the office, corridor and associated areas generally consisted of recessed, 2x4 parabolic troffers with T-8 fluorescent lamps and electronic ballasts.



The lighting in the Court areas generally consisted of 2x4, recessed, 3-lamp fixtures with three (3) T-8 lamps and electronic ballasts. Emergency battery units are utilized for emergency lighting.

Observations:

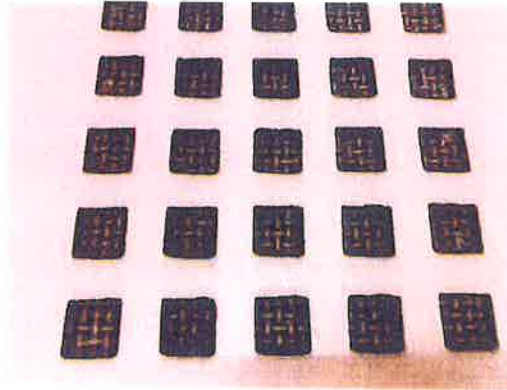
The lighting on both floors appeared to be in fair condition with some maintenance required and upgraded controls to satisfy current energy saving standards.

Recommendations:

Due to the type of lighting fixtures and controls, it is recommended that all lighting and controls throughout the facility be replaced utilizing LED fixtures. Existing lighting control and switching arrangements are dated and should be replaced. LED lighting, vacancy, and occupancy sensors are recommended.

Observations:

EF-1 was operational but is in poor shape due to age of equipment. It has surpassed it's service life and plans should be made to replace it in the near future. EF-2 has been replaced and is only 5 years old, with proper maintenance it should last another 15 years. Exhaust ductwork and grilles appear dirty and should be cleaned. Exhaust grilles have been painted multiple times over the years which caused a reduction in the open areas of the grilles, which are also clogged up with dust and debris affecting their performance.



Clogged Exhaust Grilles

Recommendations:

Based on the condition and age of EF-1, we recommend replacing the fan. Exhaust ductwork should be cleaned and the exhaust grilles should be replaced.

Make-up air is provided by two roof mounted units. Age of the equipment could not be determined due to missing name tags, but they appear to be original to the installation. They appear to be functioning but are in poor shape due to age and exposure to the elements.



VI. Jail

A. Fire Protection

The jail is protected by an automatic Class I standpipe system in the stairwells, with hose stations in the elevator lobby. The building is not currently Sprinklered.

Observations:

While the standpipe system is contemporary with the original construction of the building, the system appears to be in good working order.

Recommendations:

A Life Safety Code Analysis is recommended to determine if the building should be Sprinklered due to the Occupancy and overall height of the building.

B. Plumbing

Plumbing fixtures were noted as generally being penal type, stainless steel with concealed controls. Sanitary piping visible during the walkthrough was noted as being cast iron, and generally located in secure pipe chases. Domestic hot and cold water is served from the central plant in the basement.

Observations:

Penal fixtures appeared to be in good working condition, but may require maintenance of controls. Sanitary piping was noted to be in poor condition, with leaks and emergency repairs being noted. Water piping is beyond its life expectancy.

Recommendations:

Due to the deterioration and age of the piping systems, it is recommended that all piping systems be replaced.

C. Mechanical

The buildings heating and cooling is supplied through dual temperature piping system from the main heating/cooling plant. Buildings air distribution system is through fan coil units and make-up air units located on the roof. Heating is provided through original baseboard radiators.

Buildings exhaust needs are served by two utility type exhaust fans located on the roof. EF-1 is a Loren Cook model 270 CPV, appears to be manufactured in 1994. EF-2 is S&P USA Ventilation Systems model CM20, manufactured in 2014. Typical service life of a roof mounted exhaust fan is approximately 20 years.

Make-up Air Unit

Recommendations:

Based on the condition and age of equipment, we recommend replacing the units.

Cooling towers are Delta Cooling Towers Model 205312, manufactured in 2008.

Observations:

Typical service life for this type of equipment is approximately 20 years. With proper maintenance and water treatment, the existing cooling towers should last another 9 years.

Recommendations:

Have cooling towers cleaned and serviced. Ensure proper water treatment is provided to condenser water.

Fan coil units are missing name plates so the exact age could not be determined. They appear to be original to their installation which was not part of the original buildings design. They do appear to be 20 years or older.

Observations:

Fan coils appear to be in poor shape. According to maintenance the 3-way control valves are non-functioning, so units operate on/off instead of modulating. Coil piping accessories are in poor condition.



Fan Coil Units.

Recommendations:

Fan coil units should be replaced and updated with DDC controls to provide modulation and better control.

Baseboard radiators are original to the building and are in poor shape. Some are still functioning, but some are not.

Observations:

It appears that radiators have been painted multiple times over the years, which has reduced the free area of the openings required for proper operations. Some have cover sections missing. Typical service life for this type of equipment is approximately 25 years old. The radiators are over 40 years old and have passed their expected service life.



Recommendations:

Recommend replacing baseboard radiators and updating them for variable flow operation.

Piping within the building is original and is over 40 years old. Insulation is starting to fail, reducing the efficiency of the system. Some insulation has been patched and reinsulated, but improperly over top of original insulation.



Kitchen Hood is outdated and does not have code required make-up air system. Kitchen area is also not cooled, and most of the baseboard radiators are not functioning.

D. Electrical

Electrical Distribution Equipment

The jail's electrical service is fed from the main service in the basement.

The electrical distribution equipment includes the panelboards and dry type transformers. These items are generally original equipment.

Observations:

The panelboards, and dry type transformers appears to be original to the building and are approximately 49 years old. The panelboards are obsolete and new parts would be very difficult to obtain. These items are beyond the expected useful life of 30 years according to the "Building Owners and Managers Association" (BOMA).

Recommendations:

Based on the condition and age of the panelboards and transformers, replacement is recommended.

Branch Circuits and Feeders

The branch circuits and feeders in this area of the facility appeared to be copper in metal raceway and were original. Based on the existing drawing and electrical practice at the time of construction, we expect that the branch circuits included multi-circuit homeruns with common grounds and no equipment branch circuit grounds except through metal raceway.

Observations:

Based on the existing drawing and electrical practice at the time of construction, we expect that the branch circuits included multi-circuit home runs with a common neutral and no branch circuit equipment grounding conductor. With the new electronic ballast for the lighting and power supplies, third harmonics created on the common neutrals could result in the neutral conductors being overloaded. If equipment grounding conductors are not included in the branch circuits the loss of grounds could be expected due to the deterioration of the metal raceway in this area of the building.

Recommendations:

Due to the age of the existing conductors, lack of equipment grounding conductors, presence shared neutrals, and the recommended relocation of the main electrical service it is recommended that the existing electrical feeders and branch circuits be replaced as part of building renovations.

Lighting

Lighting in the Jail Corridors generally consisted of 1x4, vapor-proof with T-8 fluorescent lamps and electronic ballasts.



The lighting in area with a finished SAP ceiling consisted of 2x4 recessed troffer.



Observations:

The lighting appeared to be in fair condition.

Recommendations:

Due to the type of lighting fixtures and controls it is recommended that all lighting and controls throughout the facility be replaced utilizing LED fixtures. Existing lighting control and switching arrangements are dated and should be removed completely. LED lighting, vacancy, and occupancy sensors are recommended.

Fire Alarm System

Observations:

The existing building fire alarm control panel is a Notifier NFS-320 with a separate panel.

Recommendations:

The typical life span for a fire alarm control system is 15 to 20 years. This system is either at or exceeding this expectancy. The fact that the system has been discontinued and not

supported by the factory for more than 10 years is a concern. The pressing issue is that if the main panel or field device fails, spare parts will be difficult to find and will not be new. The recommendation is to consider a fire alarm system replacement within the next three years to avoid a potential unprotected building due to an equipment malfunction or failure.